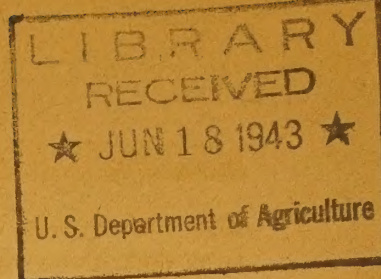


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UNITED STATES DEPARTMENT OF AGRICULTURE
U.S. Rural Electrification Administration
St. Louis, Missouri



A
FOOD PRESERVATION BY ELECTRIC DEHYDRATION

by
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THE ELECTRIC DEHYDRATOR

A home-made piece of table top kitchen equipment, the electric dehydrator may be constructed of any sound scrap material to be found in the home or on the farm and if sturdily constructed will be durable. The plans of the model attached were made from a dehydrator used by REA Cooperatives in six of the southern states and has been found entirely satisfactory. As a safety measure sheet asbestos, insulation material, or scrap metal should be used in the heating chamber below and above the electric element or the light bulbs.

The heating element necessary for the accompanying plans is 1000 watts of electricity on high which cuts down to 500 watts on low. An 8" fan has been found adequate for air flow. If the farm family owns a larger fan, it might be placed in the dehydrator when needed.

The 6-tray dehydrator holds one bushel, more or less, depending on the type of food. As many as 12 pounds of medium size green peas in the pod are not too many shelled peas for a capacity tray load. This also applies to Crowders, Whippoorwills, edible Soy Beans, shelled green beans and limas.

Cost of the home-made electric dehydrator will depend on the scrap material on hand. Insulation board is necessary to hold in the heat. For the outside, season lumber is best so that the joints will remain tight.

Using all new materials, the home-made electric dehydrator will cost from \$9 to \$18.

Racks or Trays - For frames use sturdy strips to hold the load. Screws are better than nails for putting together. One-eighth inch mesh hardware cloth is a good tray covering. Wooden strips of poplar or other oilless wood, 3/4" wide and spaced 1/8" apart, can be slid into the sulphuring chamber loaded with the slices or sections of food to be treated without damage to the tray, then transferred directly to the dehydrator. Metal will deteriorate when subjected to the sulphur fumes; therefore, metal trays must not be used in the chamber. Window screening can be used as a tray bottom, but the operation is lengthened because of lack of circulation. If wire is used it should be shellacked before using and thereafter whenever wear is indicated.

Heavy double glass, wooden strips 3/4" wide placed 1/4" apart, or 1/8" hardware cloth make excellent tray bottoms. The slatted wooden strips and the hardware cloth allow for a greater circulation which speeds the dehydration time.

DEHYDRATOR CONSTRUCTION

The home-made dehydrator, for the construction of which drawings are given, has not received professional laboratory tests, but it has been subjected to the test of actual use at some ninety demonstrations in the field and has given excellent results.

Instructions cover points concerning the operation of the dehydrator which field demonstrations indicate should be familiar to all persons using the apparatus for the first time.

The attached sheet of drawings clearly shows the various parts of the dehydrator and its completed appearance. The dehydrator is so planned that the sides, top, back, bottom and door can each be made separately and then assembled. The accompanying bill of material is necessary for completion of the dehydrator as shown. Cut the various pieces to length, marking them as to length and use so they may be assembled quickly into units.

Tools necessary for the work include a hand saw, key hole saw, claw hammer, carpenter's square, screw driver, sweep brace, and an assortment of wood bits from 1-inch down to 1/8-inch diameter.

Frames

Nail or screw together the five frames that will form the sides, top, back, and door. Be sure these frames are square by using a carpenter's square. Since only two members of each frame will touch the insulating board, filler strips are used to support the insulating board on two sides of each frame. These strips can be applied when the frames are made or after the insulating board is attached. Five nails or two 1 1/4-inch No. 6 screws should be used at each corner to prevent the frame from twisting.

Insulating Board

Mark out the dimensions of all pieces to be made of insulating board on the big sheets before doing any cutting. This will insure that all pieces can be obtained from the material on hand. Fasten each piece to its proper frame using 1-inch No. 6 screws with 1/4-inch flat washers for bearing surface to hold the insulating board firmly in place. Pieces for the sides, door, and back are 1/2-inch shorter than the frame and should fit flush at the bottom leaving a 1/2-inch space on the frame uncovered at the top. It is essential that the insulation board be applied to the frame as shown to confine the heat and to prevent the wood frame from warping out of shape.

Box Assembly

Fasten the tray steps to the tray slides. Then fasten the tray slides to the two sides of the dehydrator at the proper slope. Place the 3/4" strips that support the ventilation frame when dehydrating at their proper place at the upper edges of the back and sides and on the front tie strip. Next, fasten the back to one side and then to the other. It is usually best to nail the sides and back together temporarily before putting in the 2-inch wood screws

for permanent fastening. The next step is to fasten two tie strips across the bottom of the dehydrator and one tie strip across the front above the door. This upper tie strip is covered with an insulating board strip 2 1/2" wide on the inside to make a tight-fitting door. Three-quarter inch strips that hold the dehydrator bottom, which is made of insulating board, can then be fastened to the bottom edges of the sides and on top of the tie strips. Put in the bottom piece, fastening it in place with four 1" screws and using the 1/4" washers to hold it securely.

Fan Diaphragm and Heating Panel

Assemble the baffle through which the fan blows the air, using 3/4" strips to strengthen it. Cut the circular opening the same diameter as the blades on the fan to be used in the dehydrator. Place this baffle in position with a 2" slope to the front as indicated. Fasten it with screws through the insulation board from the outside.

The heating panel should be assembled with the 3/4" x 6" x 18" and the 3/4" x 8" x 18" boards held together with a 3/4" strip at each end. Cover this base with sheet asbestos. Next, place the porcelain receptacles in position and mark the openings for the wire to come through the base to the receptacles. Bore 1/4" holes at these points. Then screw the receptacles in place. Next connect receptacles, using asbestos covered wire and forming three circuits of two receptacles each. Bore two 5/8" holes on the left side of the panel and insert the porcelain bushings. Run the wires through the panel from the bottom and extend into the outlet box fastened outside the dehydrator at the lower left front corner. The wires should also pass through porcelain bushings into the box. Twist the wires together to form the proper circuits and connect to the switches, solder and tape the connections, and close the box. Fasten the heating panel in place with 1 1/4" No. 6 wood screws. (Note: Two designs for the heating panel are shown in the drawings; one for coiled wire and one for electric bulbs. Make only one for whichever type of heating system you have available. If bulbs are used, form three circuits. If coiled wire elements are used, form two circuits.)

Top and Door

After the permanently fastened parts are inside the dehydrator, put on the top. Hinge it on the door side with 2" butt hinges; then hang the door, using butt hinges. The door can be temporarily nailed in place to assure a tight fit when putting on the hinges. Bore a 1/4" hole for the thermometer so placed that it will register the temperature between the top and second trays.

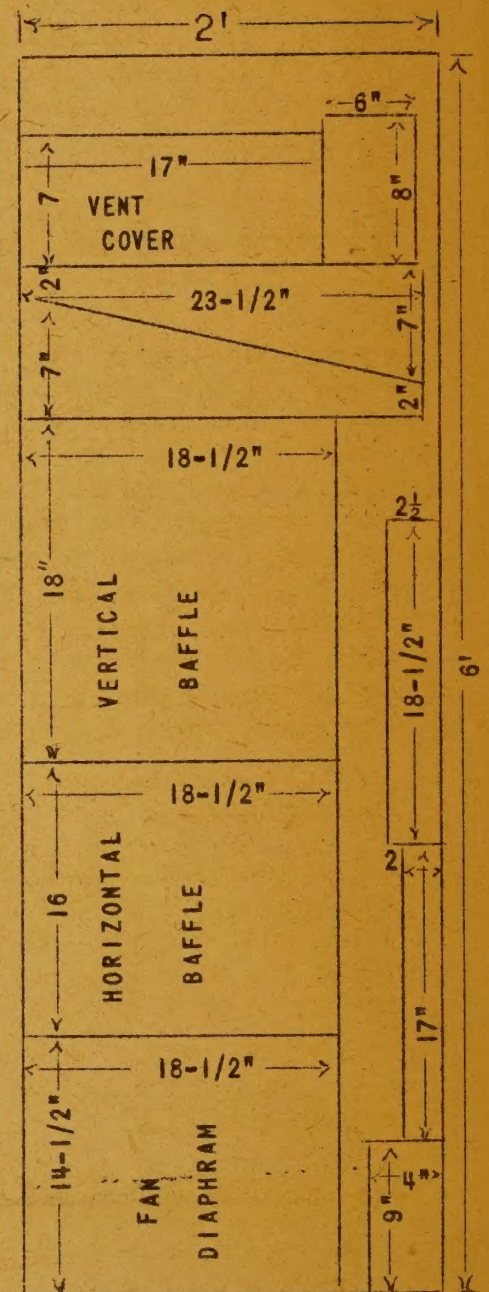
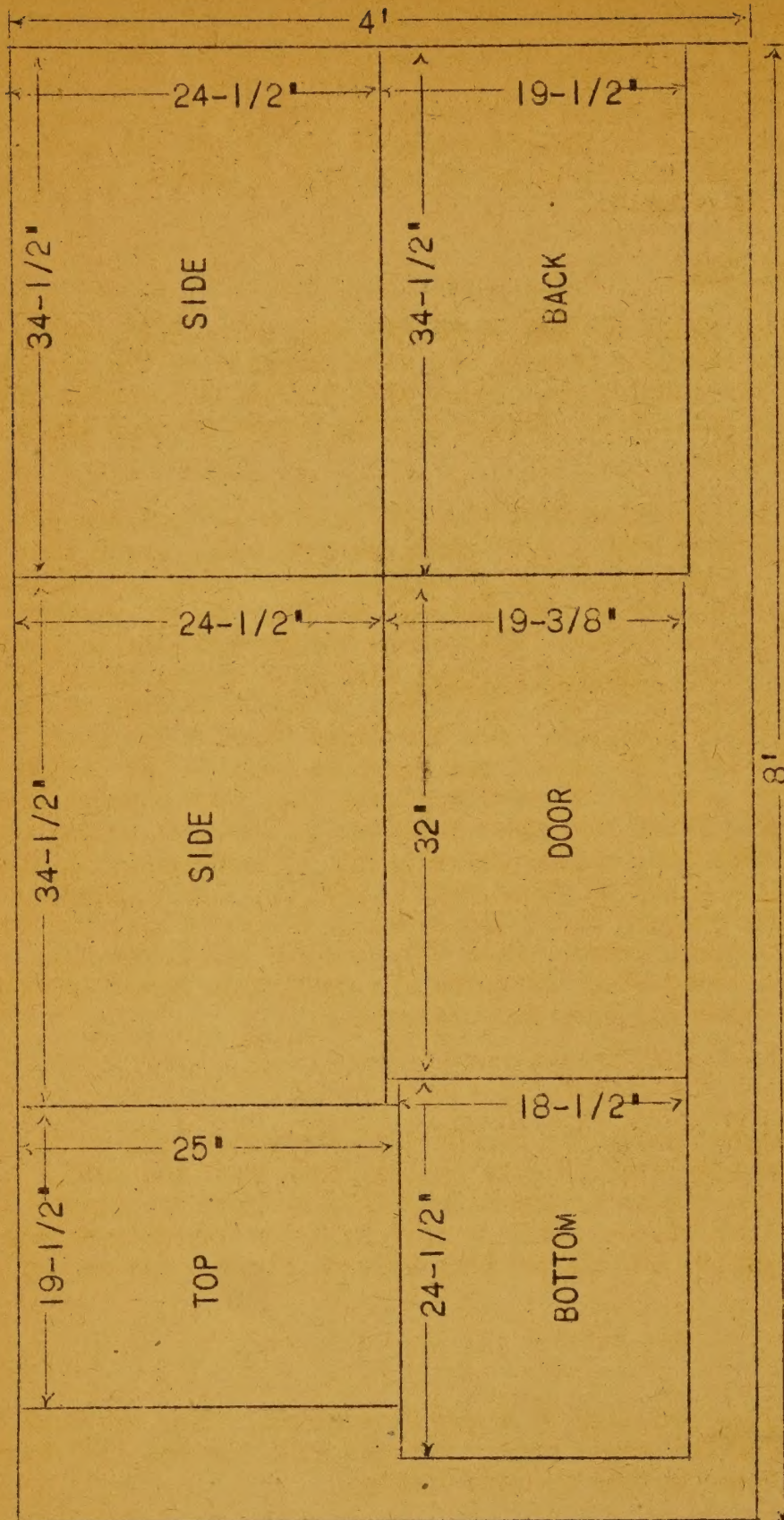
Additional Parts

The Exhaust and Intake Slides are made of insulating board. They are held in place with 1/4" flat washers and thumb nuts. Cut the slot for the 1/4" bolt just wide enough to permit the slides to move easily.

The Horizontal Baffle over the heating elements consists of a single piece of insulating board of the dimensions shown. It may be put into place or

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INSULATING BOARD PATTERN LAYOUT



taken out quickly and easily since it slides in and out like a tray.

The Verticle Baffle is made of insulating board 18 1/2" x 16" in size. Two 3/4" strips are fastened to the shorter edges with 1 1/4" No. 6 wood screws and flat washers. This panel is fastened so as to form a 2" flue for returning the cooled air to the fan for recirculation. Screws inserted through the sides and screwed into the 3/4" strips hold this panel in position. The panel should fit tightly against the back end of the tray slides. See cross section drawings.

The Sloping Insert Frame which is put in place when dehydrating is shown in Detail "B" and is made of 3/4" boards, or of plywood, if available, cut to shape and dimension. (If plywood is used, 3/4" strips should be placed in the corners for strength.) It should be covered inside with insulating board to keep the heat from escaping. The exhaust opening may be cut by boring holes at the corners and sawing out with a keyhole saw. When assembled it forms a frame that just slips inside the dehydrator. The exhaust slide can be made of plywood, 3/4" lumber or insulating board.

The Trays are eighteen inches square with mesh held securely between the upper and lower frame members. Trays should be well made using 1/2" x 1 1/4" strips with No. 4 1-1/4" screws at the corners for strength. When metal screening is used, it should be painted with clear shellac or waterproof varnish to prevent oxidation of the metal and staining the food. Do not use copper wire for the trays. Thin strips of lumber 3/4" wide placed 1/4" apart or a proper type of heavy double glass may be used.

Construction Substitution

It should be understood that the following bill of materials contains some items which may not be available locally. Substitution is satisfactory in many cases and will give comparable results in operation.

Dehydrator Top

A smooth working surface on top of the dehydrator can be made by using a piece of 5-ply, 5/8" plywood, 24" x 30" in size, in place of the detailed top framework shown in the drawing. The insulating board should then fasten directly to the plywood which is essential to keep the plywood from warping. Such top may also be constructed of tongue and groove material.

Sides

If desired, the frames may be covered on the outside with 3-ply, 1/4" plywood. This will increase the cost but the box will have more insulation and will be a better looking piece of kitchen equipment. Do not try to use plywood in place of insulation board as it will warp, and also permit too much heat to escape through the walls.

Heating Elements

Use electrical heating devices up to 1200 watts capacity, hot plates, 200 watt size electric lamps, bathroom heater elements, cone type heating element or any of the coiled wire heating elements available. It will be noted that wiring details are shown for both coiled wire and electric lamp heating panels. Only one or the other should be made.

Fans

Use ordinary household electric fans from 8" to 12" in size. Any small 110 volt motor with an 8" or 10" model airplane propeller or other type fan attached is suitable. (One dehydrator has a 1/4 HP portable motor driving an automobile radiator fan with a "V" belt.) Fans from electric room heaters are also suitable.

Curved Baffle

If the available fan blows a large quantity or a very small quantity of air, it may be necessary to improve air circulation by putting a curved baffle made of sheet metal, cardboard or plywood in the bottom corner at the door. This baffle should be approximately 18 1/2" x 12" in size. It should be bent in approximately one-quarter of a circle, inserted and fastened between the heating elements and the door. This baffle will assist the air in changing direction from its horizontal path to a vertical direction as it leaves the fan. Depending upon the size and type of fan, the curvature and position of this baffle may require adjustment in order to assist in obtaining the desired air flow.

Observation Window

A double glass window should be put in the door of the dehydrator to enable the operator to observe the dehydrating food. Cut an opening 4" x 7". Two pieces of glass 5" x 8" in size will cover this opening. A light frame can then be devised to hold the glass in position. Moisture on the inner glass indicates high humidity and the need for opening the intake and exhaust slides if they have not already been adjusted for temperature control.

BILL OF MATERIALS FOR A SIX-TRAY DEHYDRATOR

Insulating Board

1 piece 1/2" x 4' x 8' Insulating Board.

Note: Use celotex or similar material and lay out all pieces on boards before cutting to prevent waste

1 piece 1/2" x 2' x 6' Insulating

Lumber

7 pieces 3/4" x 2-3/4" x 10'

Note: Purchase clear, dry, seasoned lumber to prevent excessive shrinking and warping, preferably white pine, poplar, fir, cypress, or yellow pine may be used if necessary. Lumber for frames should be smooth dressed on all-four sides

1 piece 3/4" x 7" x 8'

6 pieces 1/2" x 1" x 12'

6 pieces 3/4" x 3/4" x 12'

Cut to

1 piece 25" x 19-1/2"
1 " 24-1/2" x 18-1/2"
1 " 19-1/2" x 34-1/2"
2 " 24-1/2" x 34-1/2"
1 piece 19-3/8" x 32"

1 piece 14-1/2" x 18-1/2"
1 " 16" x 18-1/2"
1 " 18" x 18-1/2"
1 " 6" x 8"
1 " 4" x 9"
1 " 9" x 23-1/2"
1 " 7" x 17"
1 " 2-1/2 x 18-1/2"
1 " 2" x 17"
1 " 2" x 17"

3 pieces 3/4" x 2-5/4" x 28-1/2"
2 " 3/4" x 2-3/4" x 22-1/2"
4 " 3/4" x 2-3/4" x 7-3/8"

2 pieces 3/4" x 2-3/4" x 32-1/4"
2 " 3/4" x 2-3/4" x 22-1/2"
3 pieces 3/4" x 2-3/4" x 22-1/2"

1 " 3/4" x 2-3/4" x 24-1/2"
2 pieces 3/4" x 2-3/4" x 22-1/2"
2 " 3/4" x 2-3/4" x 35"
4 pieces 3/4" x 2-3/4" x 26-1/2"
4 " 3/4" x 2-3/4" x 35"
1 piece 3/4" x 7" x 17"

1 " 3/4" x 2" x 17"
2 " 3/4" x 7" x 24-1/2"
Note: Sides are 2" wide one end - 7" wide at other end
24 pieces 1/2" x 1" x 18"
24 " 1/2" x 1" x 17"

6 pieces 3/4" x 3/4" x 30"
1 piece 3/4" x 3/4" x 17-1/4"
1 " 3/4" x 3/4" x 14"

Use

Top Insulation Cover
Dehydrator bottom
Back insulation cover
Insulation cover for sides
Door insulation cover

Fan diaphragm
Vertical baffle behind trays
Horizontal baffle
Slides to cover exhaust and intake openings
Divide diagonally
To cover sides of ventilating frame
To cover tie strip above door on inside

To cover narrow side of ventilating frame

Top frame runners
Top frame cross pieces
Fillers for space between insulating board and frame

Door - Upright pieces
Door - Cross pieces
Cross tie pieces on bottom of dehydrator and above door
Center support bottom panel

Back frame cross pieces
Back frame upright pieces
Side frame cross pieces
Side frame upright pieces
Wide piece of ventilating frame

Detail B

Narrow piece
Sides of ventilating frame
other end
Tray frames
"

Filler strips--side and back
" " bottom of door
" " bottom of back

BILL OF MATERIALS FOR A SIX-TRAY DEHYDRATOR (Cont.)

Lumber	Cut to	Use
1 piece 3/4" x 3/4" x 14"		Filler strips at top of back frame
2 " 3/4" x 3/4" x 7"		" " " front side and back
2 " 3/4" x 3/4" x 25-1/2"		and beneath bottom insulating board
1 " 3/4" x 3/4" x 19-1/4"		to support it
2 " 3/4" x 3/4" x 14-1/2"		Uprights for fan diaphragm
2 " 3/4" x 3/4" x 16"		" " vertical baffle
3 " 3/4" x 3/4" x 14"		To raising heating panel from
		floor to give wire clearance
2 " 3/4" x 3/4" x 18-1/2"		Support ventilating frame
2 " 3/4" x 3/4" x 23-1/2"		" "
2 " 3/4" x 3/4" x 16"		End strips for vertical baffle
14 " 3/4" x 3/4" x 22-1/2"		Tray slides
2 " 1/4" x 3/4" x 1"		Tray stops at front of slides
2 " 1/4" x 3/4" x 1-5/8"		" " " "
2 " 1/4" x 3/4" x 2-1/4"		" " " "
2 " 1/4" x 3/4" x 2-7/8"		" " " "
2 " 1/4" x 3/4" x 3-1/2"		" " " "
2 " 1/4" x 3/4" x 4-1/8"		" " " "
2 " 1/4" x 3/4" x 4-5/8"		" " " "
Assemble to form heating panel		Heating panel to mount porcelain
14" x 18"		receptacles on
1 piece 3/4" x 6" x 18"		
1 " 3/4" x 8" x 18"		

Electrical Supplies

	Use
6 Covered terminal porcelain receptacles	Hold heating elements or electric lamps for heating the dehydrator
1 Metal outlet box 4" x 4" size 1-1/2" deep	Hold switches and electric wires controlling and supplying current to heating elements
1 Metal outlet box cover for two toggle switches	To hold extension cord securely to outlet box
2 Toggle switches	Protect wires to heating units at the box openings
1 Box connector	and at point wires pass through panel supporting porcelain receptacles
4 - 1/2" Porcelain cable bushings	Connect dehydrator to outlet and to conduct power to heating units
12 ft. Asbestos covered extension cord. Iron or roaster cord is suitable. Do not use rubber covered wire	

BILL OF MATERIALS FOR A SIX-TRAY DEHYDRATOR

Electrical Supplies

- 6-200 watt clear or frosted, medium base
115 volt electric lamps
- or
- 3-400 watt cone type heating elements
- or
- 1-Two temperature hot plate 1000 watt size
- or
- 1 Coiled wire heating element 1000 watt capacity
1-8" to 12" Electric fan (household type)
- Hardware
- 6 doz 1/4" flat metal washers
- 6 doz Round head wood screws 1" long No. 6 size
- 2 doz No. 8 Flat head wood screws 2" long
- 1 box No. 4 Flat head wood screws 1-1/4" long
- 1/2 lb. No. 4 D finishing nails not over 1-1/2" long
- 1 oz. Wire brads 3/4" long
- 1/4 lb. Wire nails 1" long
- 2 pr. Narrow butt hinges
- 2 screen door hooks and eyes
- 2 - 1/4" machine belt 1-1/2" long with two flat
washers and one thumb nut each
- 1 Thermometer, range 100 to 200°F
- 1 roll 1/4" mesh or smaller hardware cloth 36" wide
54" long. Ordinary galvanized or aluminum window
screen may be used. Do not use copper or bronze
wire.
- 1 roll thin asbestos paper 18" x 60"
- 2 8" x 8" Window screen
- 1 pint Clear shellac

Use

Supply heat for the dehydrator. Note: Since electrical equipment is scarce and difficult to obtain any one of the different type heating devices listed will be satisfactory

Circulate the air in the dehydrator

Bearing for screws holding insulating board to the wooden frames

Hold insulating board to wooden frames
Fasten frames together forming dehydrator after frames are nailed together

Fasten trays together

For nailing frame parts together, use five at each joint

Fasten tray stops to tray slides

For nailing tray frames together to hold hardware cloth or wire screen securely

To swing dehydrator door and top

To fasten door shut when dehydrating

To fasten exhaust and intake covers in desired position

To check temperature of dehydrator

To cover trays for holding food

Cover both sides of heating panel, floor of dehydrator beneath panel and under side of horizontal baffle to prevent scorching or burning from heating elements.

To cover air intake and exhaust openings

To cover metal screen on trays

GENERAL INFORMATION ON DEHYDRATION OF FOODS

Good results in dehydration depend upon six important steps:

1. Harvesting garden, orchard or berry crops
2. Selection, grading and preparation
3. Steaming or sulphuring
4. Dehydration
5. Storage
6. Revitalizing and cooking dehydrated foods

Harvest the food to be dehydrated early in the morning before the sun withers the product. To preserve the vitamin and mineral content best results are secured by steaming and dehydrating the same day. If storing is necessary, wash fruits or vegetables and place in the refrigerator or a cool place. However, green vegetables lose much of the Vitamin C content (ascorbic acid) if held over for several days. If stored too long, other vegetables undergo a similar change.

Selection - Any variety of food which grows best locally and is a family favorite for cooking will usually make a good dehydrated product. For best recommended varieties of fruits, vegetables and berries, the State Extension Service or Experiment Stations should be consulted.

Select only firm, well ripened, highly colored and well flavored food for dehydrating. Discard all overripe or bruised products or carefully trim out the defective portions so that none of the good food will be wasted.

Grade the food to be dehydrated according to size such as large, medium, and small. Uniform slices, cubes, rings or diced pieces dehydrate evenly, and usually finish at the same time unless overdeveloped, tough or woody.

PREPARATION OF FOODS

Preparation of food for dehydrating is similar to preparation for canning.

Leafy vegetables are washed, stemmed and usually left whole with the exception of cabbage, which is shredded or broken apart in leaves. Broccoli if small is left in one piece; if quite large it may be cut in half or quartered.

Root crops are peeled, preferably with a stainless steel knife to prevent darkening. If the product turns dark when the peeling is removed, as is the case with Irish and sweet potatoes, it should be dropped into salt water, one teaspoon to the quart of water, until all are peeled and ready to be cut into the desired graded sizes or shapes. As cut, place back in the salt water until all are ready for steaming. Other root crops, carrots, beets, turnips, rutabagas, salsify, parsnips, and any others which have a tendency to darken when the protective peeling is removed should also be dropped into salt water as for potatoes.

Fruits - Grade, wash, peel if desired. If the whole or half fruit is to be dehydrated, it may be steamed until the steam has thoroughly penetrated the thickest portion. Good results have been obtained where the fruit was not steamed.

Apples and Pears will dehydrate more quickly if cut in 1/8" slices of rings or wedges. They may be left in larger sections, quarters or eighths, but these will require a much longer drying time. Thin slices are never steamed. For bleaching apples and pears and setting the color in peaches, a sulphur treatment may be given if desired. Apples and pears often darken when the peeling is removed so they should be dropped into salt water as for potatoes.

Berries - Wash to remove dust and any foreign deposits. Grade by hand to remove overripe or green fruit. Do not overlap on trays. Berries need no steaming.

Steaming or Steam Blanching - To prevent confusion with the term "water blanching," used in canning, steaming or steam blanching is considered the best pre-treatment. Vegetables to be dehydrated are usually steamed until the steam has thoroughly penetrated each piece of food.

Time for steaming or steam blanching depends on the freshness, texture, size of slices and quantity being steamed at one time. If too large a quantity of greens is placed on a tray, in a wire basket or bag of cheesecloth, or other thin material, the steam will not so readily penetrate the center. It is best to steam a smaller quantity at a time. Each leaf or section should be thoroughly wilted. Over-steaming of fruits and vegetables is not advisable; however, insufficient steaming tends to toughen the product. Beans, for instance, should be steamed until they are darker than originally. Depending upon the age, this may take as much as 30 to 40 minutes. Steam blanch food until, when a portion is broken open, it has a mealy or steamed-through appearance.

After blanching, the food should be placed on the trays in layers 1/2" deep and at the rate of approximately 1 1/2 pounds per square foot of tray area. Heavier fruit will, of course, weigh more per square foot than the lighter vegetables. If the food is spread too deeply on the trays, stirring will be necessary as the food dries and the dehydration time will be longer.

Blanching Equipment - Any large pan or kettle with a tightly fitting lid, wash boiler, preserving kettle, lard tin, canner, or steam pressure cooker, may be used as a steamer. Two or three inches of water, depending upon the size of the steamer and the height of the rack, is poured into the steamer and must be heated to a vigorous boil. The food to be blanched is placed in a wire basket, or bags of cheesecloth, or other thin material, and suspended above the water level.

If a pressure cooker is used, the petcock should remain open to avoid pressure. The lid should fit snugly, but should not be clamped down. Steaming time is often shortened when using a pressure cooker as it is built of heavy metal and holds the heat.

Racks and baskets may be made of 1/8" to 1" mesh hardware cloth to fit most any type vessel which is to be used as a steamer.

SULPHURING OR BLANCHING

Many people like white pears and apples, and a more transparent peach or apricot. However, the homemaker should use her own judgment as a tasty product may be had without sulphuring by merely giving the fruit to be dehydrated a salt water bath, such as for potatoes. If a large quantity of fruit is to be sulphured, it would be advisable to use a sulphuring chamber built for the purpose from a wooden or corrugated box 20" wide, and 22" or 24" long and of a height to accommodate the necessary number of 18" square glass or wooden strip bottom trays. Sulphur corrodes most metals so it would not be economy at this time to use the hardware cloth trays in the sulphuring box or chamber. Place wooden tracks on the sides of the box for holding trays. Leave a 2" or 3" space under the bottom tray with sufficient space between tracks for a good circulation of the sulphur fumes. For draft, make a 4" aperture in bottom and side of box. Pure sulphur must be used. The drug store 10-cent fumigation candle is satisfactory. Candles may be made at home by buying the "Flowers of Sulphur" and melting over a flameless heat in an enamelware pan. When melted it should be poured into a small pyrex dish, with or without a wick. Wicks may be made of twisted string or the sulphur may be poured into a larger dish and when hard, cut in squares of desirable sizes. One ounce of sulphur (4 tablespoons), should be used for each bushel of fruit.

Peaches and apricots require 30 minutes for sulphuring; pears, 40 minutes, apples and figs, 15 minutes. Berries should not be sulphured as sulphur removes the red color by bleaching.

Sulphuring is finished when the dark spots (oxidation) have disappeared, or when the juice seems to "ooze" from the fruit pores. Never use the dehydrator as a sulphuring chamber. If the side walls are of porous material, such as insulation board or pressed wood, the walls will become saturated with the sulphur and vegetables will take up a definite flavor of the sulphur; also the metal elements and fan will become corroded and shortly replacements will be necessary. A barrel makes a good sulphuring chamber. The candle is placed in the bottom of the barrel and the fruit to be sulphured is placed in a split wood basket and lowered over the burning sulphur. The barrel should be covered tightly to hold in the fumes.

Greens - Cabbage, kale, mustard, spinach, turnip and all other greens or leafy vegetables should be steam blanched until the steam has thoroughly penetrated each leaf. If a great quantity of greens is to be dehydrated at one time, care should be taken to see that the inside leaves are as completely steamed as those on the outside of the rack or basket; therefore, it would be easier to spread thinly over the rack or basket and steam a small quantity. In appearance the greens should be dry, but not powder dry. Approximate drying time is 1-1/2 to 8 hours, depending upon the thickness of the shredded food or leaves and the loading of the tray.

Turnips. Steam blanch. Because of the sulphur content in the turnip, special precaution should be taken by placing a piece of cloth between the turnips and the metal rack in case screen wire or galvanized cloth has been used as a base for the racks. Stainless steel knives should be used in peeling and slicing turnips to prevent their turning black as the 1/8" slice comes in contact with iron. Dry to brittle dryness.

Approximate drying time 4 to 8 hours, depending upon the thickness of the slices and the loading of the trays.

Onions - Peel, slice 1/8" thick, and place directly on rack for dehydration; steam blanching is not necessary as it has been found that the texture, color and flavor are much better if not pretreated. Dehydrate until light in color and transparent, and brittle dry. Onion salt may be made by rolling to a powder 1 teaspoon salt to 1 tablespoon onion powder. Approximate drying time 6 to 9 hours, depending upon the thickness of the slices and the loading of the tray.

Edible Soybeans - In many countries these are rapidly taking the place of milk, eggs, and meat. They are a delicious vegetable, green, mature or dehydrated in the green stage. An easy method of removing the hull of the bean is to submerge in boiling water for from 3 to 5 minutes depending upon the toughness of the bean hull. The soybean is steamed until the steam thoroughly penetrates; then dehydrated to a dryness so that when dropped on the floor and stepped on with a rotary movement of the foot, the bean crushes to powder. This is also a good drying test for English peas, and other like pod products. Approximate drying time 6 to 9 hours, depending upon the quantity loaded on the tray.

Corn - When the kernels have reached the preferred stage of maturity, corn should be gathered from the stalk early in the morning. Husk, trim, and steam blanch on the cob until the steam has thoroughly penetrated each kernel. Remove from the steam blanch and if cream style corn is preferred, make two cuttings, but do not scrape. Place immediately on cheesecloth or other thin material to prevent sifting through the wire or wooden slot racks. Dehydrate until brittle and of a transparent appearance. Approximate drying time, 14 to 20 hours, depending upon the tray load.

Beans, peas, butter beans and similar crops are prepared as for table use and then steamed before dehydration. When preparing food for the dehydrator, it should be reduced to smaller pieces of uniform thickness and size to insure adequate steaming and uniform drying of all pieces.

String Beans - String beans should be snapped in one-half or three-quarter inch lengths. Young undeveloped pods should not be used because they will not revitalize well and are not as nutritious as pods with a well developed bean. Wash thoroughly and steam; sometimes 45 minutes is necessary, depending upon the variety of bean, the number of beans steamed at one time, and the source of heat. The beans should be dehydrated immediately after steaming and when completed should be dry, brittle and very dark in color. A bright green color indicates inadequate steaming and a straw color is obtained if the water comes in contact with the beans during steaming. Pack in moisture proof bags, place bags in tin cans, or other insect and moisture proof containers immediately after dehydration is completed. Approximate drying time for beans 7 to 14 hours, depending upon the quantity loaded on the tray.

Carrots - Select medium sized well colored roots. Scrape and cut into round pieces $1/8$ " thick. Round cut carrots will shrink to very small buttons and will pack well. Carrots may be shredded lengthwise for drying, if desired. Steam until, when broken open, the inside of the slice is hot and has a mealy appearance; from 8 to 15 minutes, or longer. Load on trays, start dehydration immediately. Rich golden yellow tough-to-brittle dry. Approximate drying time 7 to 10 hours, depending on the quantity loaded on the tray.

Peaches - If the half peach is desired, it may either be peeled or the skin may be left on. If the latter is desired, remove the fuzz by wiping with a cloth; cut in half, remove the seed, and the peach is then ready for sulphuring if desired, or it may be placed cup side up on the wooden or metal racks and placed immediately in the dehydrator. Peaches should be dehydrated to a pliable, leathery dryness. The size, large, medium or small, will determine the drying time. Approximate drying time 12 to 20 hours, depending on the quantity loaded on the tray.

Apples - Peel, remove core and slice in rings or wedges $1/8$ " thick. To prevent the growth of enzymes, drop into water, one teaspoon salt to the quart. When all are ready for the sulphur treatment, place in basket or on wooden trays and treat 30 minutes to the bushel. Apples should be dehydrated to a leathery dryness. Do not overcrowd trays. Approximate drying time 6 to 12 hours depending on the quantity loaded on the tray.

Pears - Peel, slice in desired pieces, drop into salt water and proceed as for apples. Pears should be dehydrated to a springy dryness. They may be sulphured. Approximate drying time 8 to 14 hours, depending on the quantity loaded on the tray.

Figs - Figs should be washed and placed immediately on the dehydrator tray as they require no previous treatment. Dehydrate until glossy with a dry skin, inside flesh slightly moist. If desired, may steam until thoroughly penetrated. Whole fruit takes a much longer drying time. Approximate drying time 10 to 20 hours, depending on the size and the quantity loaded on the tray.

Plums - Wash, cut in half or leave whole, dry as for figs, glossy dry skin, slightly moist, pliable flesh. Approximate drying time 10 to 20 hours, depending on the size and the quantity loaded on the tray.

Damsons - Wash, place on tray whole, and dehydrate to a glossy dry skin with a slightly moist inner flesh. Approximate drying time 10 to 20 hours, depending on the size and the quantity loaded on the tray.

Cherries - Same as for plums, figs and damsons. Approximate drying time 8 to 14 hours, depending upon the quantity loaded on the tray.

Grapes - Wash, may be left on the bunch, removing all webs and cocoons which are so often found on the grape bunches, or they may be removed

from the bunch and dehydrated singly. Dehydrate to a glossy dry skin, inside flesh slightly moist and pliable. After dehydration the seeds may be pinched out. Approximate drying time 8 to 12 hours, depending upon the quantity loaded on the tray.

Berries - Dew berries, blackberries and Boyson berries lend themselves better to dehydrating than others. Much is to be learned in the field of berry dehydration. A cool, thin syrup, using honey as a base, may be used as a dip. Place on racks and dehydrate until outside is dry and inside pliable and moist. Approximate drying time 8 to 14 hours, depending upon the quantity loaded on the tray.

OPERATION OF THE DEHYDRATOR

For all steam blanched food the dehydrator should be preheated to 150°F. Sulphured food which is not steam blanched may be started in a cold dehydrator. Food should be spread evenly over the trays and not too thick. One-half inch is satisfactory. If loaded too heavily, the food must be stirred on the average of once every hour to insure evenness of drying. For small green foods, such as Crowder peas, butter beans, baby limas, black eyed peas, corn, English peas, etc., it may be necessary to place a layer of cheesecloth or other thin material on the tray to prevent falling through as the food dehydrates. Food that does not pack down may be loaded more heavily on the trays.

To avoid loss of heat and moist air, the dehydrator should be opened only when necessary. Temperatures of dehydration vary for different products. In most cases 150°F will provide sufficient heat to dehydrate rapidly.

To save heat and thus remove all moisture at the least cost, the air is recirculated many times through the vertical baffle. Fresh air is admitted only to keep the temperature down and to permit saturated air to escape. This is accomplished by adjusting the ventilators at the top and bottom of the dehydrator to allow only a small amount of air to escape. The air should feel damp and hot when escaping and the temperature should always be at least 150°F and not more than 160°F at any time. Practice will teach you how to adjust the ventilators.

The fan should be large enough to force the air out with a strong current when the exhaust is open. Watch your dehydration temperatures carefully. A dairy thermometer or in fact any thermometer registering from 100°F to 175°F will be satisfactory. As the operator becomes experienced in dehydration methods, it will not be necessary to check so closely with a thermometer. After becoming familiar with the methods and the box, a thermometer is not needed.

As dehydration approaches completion the temperature will gradually rise. Do not let it go above 160°F in any case. Turn off some heat and open or close the ventilators slightly to maintain the proper temperature. Turn the heat on again if necessary. The wiring diagram provides for turning on and off 1000 watts and 500 watts of heat. The fan and 500 watts should always be on when dehydrating. Use the smallest amount of wattage necessary

to maintain temperature and adjust the ventilators to regulate air discharge to maintain temperature also. Use all heating elements to raise the temperature to 150°F with the ventilators completely closed.

DRYING TIME

The drying time will vary with the product and quantity being dried. Fruit, depending upon the variety, will vary from 4 to 24 hours depending on the thickness of the slices and the moisture content of the food; apples, for instance, require from 4 to 8 hours; peaches, from 12 to 14 hours; whole fruit, such as figs, plums, and grapes require a much longer time--possibly 18 to 24 hours. Greens dry more quickly than other foods, 1 1/2 to 4 hours. The end of the drying period will be determined by the characteristics of the product, as described in the accompanying information. If the drying time is too long, the indication would be too much food on the tray, or insufficient heating elements in use. The quality of the dried food will also be inferior if the drying time is lengthened.

The time to remove the product from the dehydrator will be determined by the appearance of the product, the tendency for the temperature to rise above the maximum safe and final temperature, and the physical condition of the dried product.

Cut-off switches enable the operator to reduce the temperature by controlling the heating elements when the temperature arises above 160°F before the food is sufficiently dehydrated. In some cases, as for peaches and pumpkins, the ventilators must be opened to capacity and the heat reduced. The ventilators are adjustable and should be closed at the start of the dehydration period. They should be adjusted thereafter to control the humidity.

STORING DEHYDRATED FOODS

Food should be packaged immediately when removed from the dehydrator trays even while still warm. Any moisture and insect proof bag or carton, such as those used for storing frozen foods, are excellent for this purpose. The moisture proof bag is lined with cellophane or a treated thin paper; the outside is usually of a heavy white or brown thick paper. The bags with ears or lugs may be used for several years as they need not be cut off, as must be done with cellophane when sealed with a hot iron. Food sufficient for only one or two meals should be placed in a bag or container. If the bags are too large there is danger of the opened food becoming saturated with moisture. Spoilage will be the result. Convenient size bags and containers are from 1/4 to 2 pounds.

Dehydrated foods must be kept dry and protected from insects, mice and rats. The packaged food should be placed in tin containers with tightly fitting lids, such as clean sterilized coffee cans, syrup buckets or lard tins.

Examine dehydrated food every ten days for the first two months to see if deterioration has begun. This is especially necessary until experience

is gained in drying and storing food. If all particles of food are not equally dry there will be a tendency to equalize the moisture in the various particles. If this occurs, the food should be replaced in the dehydrator and heated to a temperature of 160°F for an hour or two and again placed in containers. If food has molded or been damaged by insects or rodents, it should be discarded to prevent contamination of other food stored in the same or near-by places.

Do not be alarmed at strong odors and flavors in dried foods. Dried food is greatly reduced in weight, and flavors are concentrated because practically all water has been removed. Upon revitalizing, the food will be normal in color, flavor, and appearance, if blanching, dehydration and storage have been properly done.

REVITALIZING FOOD

The quantity desired for a meal should be removed from the moisture-proof bag, placed in a pan, and just well covered with cold or luke-warm water (luke-warm water speeds the revitalizing process). Do not use an over abundance of water for revitalizing as the food should be cooked in the water in which it has been revitalized in order to retain the minerals and vitamins which may have escaped into the water in the revitalizing process. Look at the food being revitalized during this period to see whether more water should be added than was put on the food originally.

Dehydrated foods require from one-half to two hours for revitalizing. Never soak dehydrated green foods over night.

COOKING DEHYDRATED FOODS

Dehydrated, revitalized, cooked food is comparable to products conserved by canning, preserving, or other methods. The color, flavor, and odor remain with dehydrated food when properly revitalized and cooked.

Dehydrated food cannot be called a fresh food because throughout the dehydration period the product has been subjected to a period of heat. Therefore, the food cannot be fresh, but when revitalized it is very much like the green garden product.

Never permit revitalized dehydrated foods to boil vigorously as the texture of the food will be maintained only if a low cooking heat is used. Season dehydrated foods according to the family tastes, taking care to add very little salt as the minerals are all outstanding in the cooked dehydrated foods.

The following is a general plan for revitalizing and cooking:

1. Measure food and add cold water and soak for two to four hours. Luke-warm water may be used for a much shorter period.

2. Be sure all food is immersed.
3. Add salt to taste after 30 minutes or just before cooking. Heat to a boil and then simmer until done.
4. Season and serve as garden fresh vegetables.
5. Do not put food into cold water and start to cook immediately as it will toughen the food.

GENERAL CONSIDERATIONS

A great deal still remains to be discovered about the dehydration of food and the operation of the dehydrator. It should also be remembered that understanding of and skill in the dehydration of food will be increased with practice. Individuals will become more or less skillful as operators of dehydrators, just as in other food preservation methods, such as canning, freezing, and meat curing.

Each home-made dehydrator can be expected to require slightly different handling. The individual operator after several dehydration operations will have learned more than any one person can tell him about dehydration with his particular equipment. Varieties of vegetables available may require considerably different treatment than is recognized as standard for best results. It is also possible that different soils and climates will affect the foods in such a way that different blanching and dehydrating and storing methods will have to be devised for satisfactory results. Since it is essential that all six steps in the preservation of food by dehydration be done properly it will be necessary to become skillful in all of the details involved in the selection and preparation of food, blanching, the dehydration procedure, storing, and cooking the food for entirely satisfactory results.

Other plans for dehydrators are available from various sources. Innovations are being made from time to time in these dehydrators and as we experiment with them, any improvements will be passed on.